

REMARKS

This application has been reviewed in light of the Office Action dated September 8, 2003. Claims 1-9, 11-14, and 16-19, are presented for examination. Claims 10 and 15 have been cancelled, without prejudice or disclaimer. Claims 1, 4, 7-9, 11, and 12 have been amended to define more clearly what Applicants regard as their invention. New Claims 16-19 have been added to provide Applicants with a more complete scope of protection. Claims 1, 11, 12 and 16 are in independent form. Favorable reconsideration is requested.

The title has been replaced with a new, more descriptive title, as required in the Office Action.

Claim 4, which was rejected in the Office Action under 35 U.S.C. §112, second paragraph, for being indefinite, has been amended as deemed necessary to overcome the rejection. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 1, 4, 5, 7, 9-12, and 15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,734,361 (*Suzuki et al.*) in view of U.S. Patent No. 6,091,381 (*Uenuma*).

According to an aspect of the invention to which Claim 1 relates, column lines are divided into blocks and a voltage drop is calculated for each block, enabling a smaller calculation quantity and hardware scale adjustment.

In addition, gradation levels are divided into blocks, a voltage drop is calculated for each gradation step, and in pulse width modulation driving (i.e., since the pulse width varies according to the gradation level the voltage drop varies within 1H

period), a more accurate voltage drop is calculated. Further, the calculation quantity and the hardware scale can be made smaller, rather than in the case where calculation is performed without assigning the gradation level into the blocks.

Suzuki et al., discloses a method of detecting a binary image pattern, calculating a correcting value for a voltage drop according to the image pattern, and driving a cold cathode element based on the correction image data.

However, as the Examiner correctly points out, *Suzuki et al.* does not disclose or suggest a second means for defining a plurality of periods within one horizontal interval, the periods being associated with widths of approximating pulses corresponding respectively to the gradation steps. In addition, Claim 1 is believed to be patentably distinguishable over *Suzuki et al.*, because *Suzuki et al.* does not disclose dividing column lines into blocks each of which includes at least two column lines, and dividing gradation levels into gradation steps each of which includes at least two gradation levels.

Still another distinguishing aspect, is that *Suzuki et al.* discloses pulse width modulation driving, but does not teach or suggest calculating a correction value for the voltage drop based upon a statistical calculation of an electron beam request value, which corresponds to the statistical calculation for the gradation step associated with the pulse width.

As such, for at least the reasons discussed above, Claim 1 is deemed patentable over *Suzuki et al.*

Uenuma is cited for disclosing a display device capable of realizing step-less gradation to improve the quality of an image displayed, by providing means for

defining a plurality of periods within one horizontal interval, the width of approximating pulses.

In *Uenuma*, an FET gate pulse is generated in a sample hold value based on a video signal and a field-emission cathode is driven by a constant current according to V_{DS} - I_D characteristics of the FET to achieve non-stepped gradation. However, *Uenuma* discloses that the pulse width modulation provides restrictive and insufficient gradation expression, thereby preventing the display from being provided with increased quality (see Col. 1, lines 44-56). *Uenuma* also fails to disclose dividing one horizontal period into subintervals corresponding to the approximated pulse width corresponding to the plural gradation steps.

Accordingly, even if *Suzuki et al.* were to be combined with *Uenuma*, such a combination would still not teach or suggest (1) dividing column lines into blocks each of which includes at least two column lines, and (2) dividing gradation levels into gradation steps each of which includes at least two gradation levels. As such, Claim 1 is deemed patentable over *Suzuki et al.* and *Uenuma*, whether considered separately or in combination.

Claim 11 is directed to a method of driving a display apparatus comprising electron emission elements aligned in a matrix on a substrate and driven by column lines and row lines, a column line drive unit for driving the column lines in a pulse width modulation manner by applying to each column line one of pulses which have different pulse widths respectively corresponding to gradation levels of a luminance signal to be displayed in the display apparatus and a row line drive unit for sequentially driving

the row lines. The method comprises the steps of: calculating a voltage drop due to a resistance in the row line and the current flow on the row line, and modifying the luminance signal according to the calculated voltage drop so that for the same luminance data, a width of a voltage pulse applied to a column line is longer as the column line is aligned more distant from a terminal connected to the row line drive unit.

In contrast, *Suzuki et al.* only discloses a pulse width modulation driving step. Otherwise, *Suzuki et al.* makes no teaching or suggestion that a driving pulse is applied to each column wiring according to the correction image data subjected to the voltage drop correction.

Uenuma, discussed above, does not remedy what is missing from *Suzuki et al.* Therefore, Claim 11 is deemed patentable over *Suzuki et al.* and *Uenuma*, taken alone or in combination.

Claim 12 is directed to a method that involves the use of an apparatus (similar to the apparatus of Claim 1), and is in many respects similar to Claim 1. For substantially the same reasons as those discussed above for Claim 1, Claim 12 is deemed patentable over *Suzuki et al.* and *Uenuma*, taken alone or in combination.

Newly added Claims 16-19 are also believed to be patentably distinguishable over *Suzuki et al.* and *Uenuma*, alone or in combination because Claims 16-19 incorporate the feature of dividing one horizontal interval into a plurality of periods and calculating a voltage drop per each of the plurality of periods divided, which is not seen to be taught or suggested by *Suzuki et al.* or *Uenuma*. Accordingly, Claims 16-19 also are believed to be clearly patentable over those references.

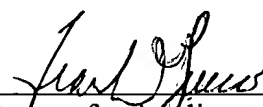
The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Attorney for Applicants
Registration No. 42,476

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200